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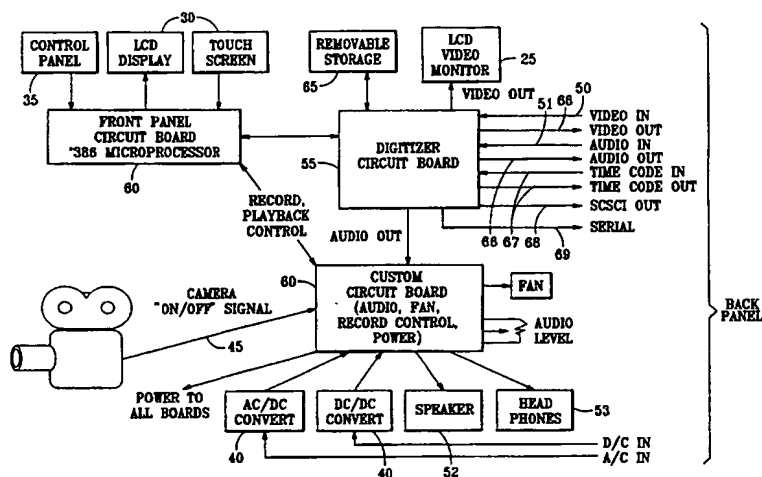
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(54) Title: REMOTE VIDEO ASSIST RECORDER BOX



**(57) Abstract**

A Remote Video Assist Recorder Box (10) is suitable for remote use in "on location" production environment. Multiple takes on a single channel may be digitally recorded concurrently with camera filming. Recording is automatically triggered upon the "rolling" of the camera (45) and stops when the camera stops filming. Recorded clips may be marked as "good" takes. Fast playback of recorded clips may be provided through either one-button (115) or automatic queuing to the beginning of a just recorded clip. Clips may be played back individually, or all or only marked clips may be played back sequentially. Clips may also be selectively deleted either individually, or in a group (all marked clips or all clips). Selective control of compression ratios, frames-per-second emulation of recorded clips, nominal video standards, nominal speed, and slow motion standards are also included. The Remote Video Assist Recorder Box (10) may be operated as a "standalone" system in a production environment, or may be integrated into a larger, full-feature video assist system; alternatively, recorded clips may be exported from the system to other systems or devices.

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## REMOTE VIDEO ASSIST RECORDER BOX

## 5 FIELD OF THE INVENTION

The field of the present invention relates to motion picture and television production, including film or video generally and, more specifically, to video recording and playback. In particular, it relates to a remote video assist recorder box for use in motion picture, television, or other film/video production that provides for digital  
10 recording and playback of video directly from a camera and with near instantaneous reviewing and other video assist capabilities.

## BACKGROUND

Production of motion pictures, television programming, and other film/video related projects is an involved and complicated process typically requiring the recording of  
15 multiple takes of any particular scene in order to obtain the feel, look, emotion, timing, attitude and other characteristics that the director wants for the piece. From the resulting array of multiple take recordings, the director weaves his/her vision by piecing together select portions of various recordings of various scenes.

20 Video assist technologies have been developed in order to aid in the process of identifying "good" takes that may be selected from and compiled in the process of creating a final product. Many of these technologies have involved the use of video recording devices, used in conjunction with traditional film cameras, to provide a means for reviewing recorded scenes more rapidly in order to assess whether or not they  
25 satisfactorily achieve the directors goals.

Past production processes incorporating video assist technologies have primarily utilized analog equipment and relied heavily upon notes taken down manually by production staff. Accordingly, significant wait times have been required for queuing of videotapes to the proper segment for review and/or continued taping. As well, extra  
30 coordination with the camera crew was required to ensure that the videotape recorder properly recorded concurrently with the running of the shooting camera. While the recent introduction of digital recording equipment into the production process has offered some

marginal improvements, such systems have still primarily been designed as part of a larger, more complex system, such as may be found in a sound studio or a more permanent production environment. Such systems have also still required coordination with the operation of the shooting camera in order to ensure concurrent recording and have also  
5 relied on significant note taking with respect to the resultant takes (e.g., which takes were "good", etc.). Further, queuing in such systems has remained manual, thus requiring additional time to reset takes to their start for review.

Particularly in remote filming environments, there is a need for portable equipment that may offer some of the benefits of larger video assist technologies, yet do so in a  
10 manageable and efficient package.

#### STATEMENT OF THE INVENTION

The present invention relates to video assist systems and methods for use in motion picture, television, or other film/video production which provide for digital recording and  
15 playback of video directly from a camera and with near instantaneous reviewing and other video assist capabilities. The instant video assist systems and methods may be provided in a package which is suitable for remote use in "on location" production environments with later transfer of recorded and stored information to a full-featured video assist system for subsequent operation.

20 The systems and methods herein may be utilized to digitally record scene takes as they are being shot. The shooting camera provides the video input to be recorded, as well as a means for triggering the recording of the video input by the instant system. Thus, recording by the instant system automatically occurs concurrently with the "rolling" of the shooting camera. Fast playback of recorded materials (e.g., a particular take just recorded)  
25 may also be provided through automatic queuing to the beginning of the just-recorded material upon completion of the take (i.e., when the shooting camera finishes "rolling"). The systems and methods herein also provide means for tagging or marking specific takes (e.g., as "good" takes), and for selectively playing back takes (e.g., all takes, "good" takes only, etc.) or deleting takes.

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Accordingly, the preferred embodiments herein may provide one or more of the following objects and advantages:

- to provide an easy-to-use interface for controlling multiple take recordings with instant playback/review capabilities;
- 5       -- to provide such a system and method which allows for near instantaneous access to multiple take recordings presently in production;
- to provide such a system and method which allows for efficient management and control of recording and playback of multiple recordings;
- to provide such a system and method incorporating digital recording of  
10 video input;
- to provide such a system and method which offers such functionality in a package which may be readily used in remote production environments; and,
- to provide such a system and method which allows for the storage of recorded materials and subsequent transfer to other production equipment for further  
15 review and processing.

Other objects and advantages of the present video assist systems and methods will become apparent to those skilled in the art from a review of the detailed description in conjunction with the accompanying drawings.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an illustration of a remote video assist recorder box according to a preferred embodiment herein.

Figure 2 is a block diagram illustrating the components of a remote video assist  
25 recorder box according to a preferred embodiment herein.

Figure 3 is an illustration of a control panel according to a preferred embodiment of the remote video assist recorder box herein.

Figure 4 depicts an exemplary display screen just prior to commencement of recording a clip according to a preferred embodiment herein.

30       Figure 5 depicts an exemplary display screen upon initiation of playback of a clip according to a preferred embodiment herein.

Figure 6 depicts an exemplary display screen for use in identifying and operating upon stored clips according to a preferred embodiment herein.

Figures 7 and 8 depict exemplary display screens for use in entering alphanumeric information associated with stored clips according to a preferred embodiment herein.

5 Figure 9 depicts an exemplary display screen for use in entering frame per second information associated with clips according to a preferred embodiment herein.

Figure 10 depicts an exemplary display screen for use in establishing nominal settings to be utilized by the system according to a preferred embodiment herein.

10 Figure 11 depicts an exemplary display screen for use in setting nominal frames per second according to a preferred embodiment herein.

Figure 12 depicts an exemplary display screen for use in setting the compression level to be utilized in association with the storage of the corresponding clip and for identifying estimated remaining storage capacity of the storage device 65 in accordance with a preferred embodiment herein.

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#### DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to Figure 1, a Remote Video Assist Recorder Box 10 according to a preferred embodiment herein is shown. Such a Remote Video Assist Recorder Box 10 as disclosed herein may offer "standalone" functionality when interconnected with a camera  
20 (not shown, but which may comprise either a film or video camera) for shooting scenes in a production environment. The Remote Video Assist Recorder Box 10 is ideally suited for remote production applications, but may be utilized in any environment wherein film/video production is performed.

It is also envisioned that the Remote Video Assist Recorder Box 10 may be  
25 useable in conjunction with a full-feature video assist control system. Such use may be concurrent with or, in accordance with a preferred embodiment, subsequent to use at the time a scene is filmed by transferring recorded clips and related information to the full-feature system. For example, the instant system and methods may be useable in conjunction with such full-feature video assist control system as is described in U.S.  
30 Patent Application 09/095,771, which application claims priority to U.S. Provisional Patent Application 60/049,616 (both of which are incorporated by reference as though fully set forth herein).

It is noted that throughout this application traditional production terms, such as “film”, “filming”, “rolling”, and the like, are referenced. While such terms originated in the concept of film cameras, their application is also known to those in the art in relation to production projects utilizing video camera technologies. Accordingly, use of such terms herein should not be construed as any limitation to traditional film camera environments or technologies.

The Remote Video Assist Recorder Box 10 provides record, playback and monitoring functionality housed in a single unit that allows sequential digital recording of multiple video takes on a single channel with near instantaneous playback and review capabilities. With reference to Figure 1, a preferred embodiment of the Remote Video Assist Recorder Box 10 comprises a lower hinged portion 15 and an upper hinged portion 20. The lower hinged portion 15 and upper hinged portion 20 comprise a case that may be closed for carrying the unit to a “filming” location while protecting the internal components. Such a case further advantageously provides an easy to set up and use recorder/reviewer that is ideal for remote (i.e., away from a main set) operation. A monitor 25 is incorporated within the upper hinged portion 20 and may be useable for viewing the material being recorded and for reviewing previously recorded material. In a preferred embodiment, the monitor 25 comprises an LCD video monitor. A display 30, which comprises a touch screen display in a preferred embodiment, and a control panel 35 are incorporated within the lower hinged portion 15 offering control and functionality and providing ready access to view control information and settings, as further detailed hereinbelow.

It is noted that while a preferred embodiment comprises a hinged unit with components arranged as in Figure 1, other arrangements may be envisioned and are intended to be within the scope and spirit of the systems and methods as set forth herein. For example, differing means for connecting upper and lower portions, differing arrangements of components, a single housing incorporating the components, and the like, may alternatively be implemented in accordance with the teachings herein.

With reference to Figure 2, a block diagram illustrates the internal components of a preferred embodiment of the Remote Video Assist Recorder Box 10 of Figure 1. A power supply 40 provides power to the Remote Video Assist Recorder Box 10. In a preferred embodiment, power supply 40 comprises both AC and DC inputs. Accordingly, power

may be supplied through a standard electrical connection or alternatively via a battery(ies). Still further, it may be envisioned that power may be supplied via batteries internal to the unit or from an external generator or other power source. A camera status input 45 provides an indication from a camera used for shooting a scene(s) to be recorded (not shown) to the Remote Video Assist Recorder Box 10 of whether the camera is on ("rolling") or off.

A video input signal 50 is received by a digitizing board 55 and, based upon further input and instruction from a control board 60 (which may comprise a programmable micro-controller), operates to digitize the video input signal 50 for subsequent recording and storage in a storage device 65 as may be applicable in accordance with the operation of a preferred embodiment as further set forth hereinbelow. It is noted that an audio input signal 51 is also received into the digitizing board 55. It is assumed in that references to the video input signal 50 herein in relation to the recording/playback, etc. of clips are intended to include recording/playback, etc. of the corresponding audio input signal 51 therewith. In this regard, too, the Remote Video Assist Recorder Box 10 of a preferred embodiment incorporates a speaker 52 and headphone connection 53 to enable listening to the corresponding audio input signal 51 or recorded version thereof upon playback of clips.

Additional connections in and out of the Remote Video Assist Recorder Box 10 in a preferred embodiment include video/audio output signals 66, time code in/out signals 67, an SCSCI connection 68, and a serial port interface 69. These additional connections may be utilized where it may be desired to utilize signal information or recorded clips externally from the system itself. For example, it may be desired to view the video input signal 50 information, or the playback of recorded clips, on a separate external monitor(s). It may also be desired to export a clip(s) from the storage device 65 to an external hard drive or other storage device for subsequent transfer to a further system or device for viewing, manipulation of recordings, or other operation. As well, it may further be desired to integrate the Remote Video Assist Recorder Box 10 into a larger system, such as a full-feature video assist system, which would necessitate the exportation of information from the instant system.

Such exportation may be enabled through use of the additional connections identified immediately above. In the case of exportation, it is further envisioned that an



export screen may be utilized in a manner similar to the delete function detailed hereinabove in order to provide for selective exportation of clips (e.g., only a selected clip, a group of selected clips, all marked clips, all clips, etc.). The additional connections may further provide for further control and feature implementation from an external control source (e.g., an external programmed device, a laptop, etc.) through which additional functionality may be realized.

It is noted that control board 60 is illustrated in Figure 2 as multiple components that are interfaced with the display 30 and the control panel 35 in a coordinated manner to provide a user with the functional and operational control as further detailed hereinbelow according to a preferred embodiment. It may be envisioned that control board 60 may alternatively comprise a single board that may, further alternatively, be combined with the digitizing board 55 without departure from the scope and spirit of the inventive concepts set forth herein. As well, in a preferred embodiment, the storage device 65 comprises a removable hard disk storage device, but may alternatively comprise a fixed storage device or other suitable known storage medium.

In a preferred embodiment, recording of a clip (i.e., a take) by the Remote Video Assist Recorder Box 10 may advantageously commence automatically with the "rolling" of the camera. If recording of a particular take being "filmed" by the camera is not desired, a pass-thru mode may be selected, as described below, in order to prevent recording while allowing viewing only of the video input signal 50 on the monitor 25. Further advantageously, recording in a preferred embodiment is automatically stopped when camera "rolling" ends.

The Remote Video Assist Recorder Box 10 provides basic recording functionality, such as may be found in known digital video recording systems. For such basic recording functionality, a preferred embodiment utilizes a digitizing card and controls, including software controls, based upon an Omega digital video recorder from Fast Forward Video, Inc. Custom modifications to such components and controls provide for additional functionality and control as further detailed hereinbelow.

The Remote Video Assist Recorder Box 10 allows multiple clips, which may, for example, comprise multiple takes of a particular production scene, to be recorded in series. The number of clips that may be recorded and stored is primarily a function of the capacity of the storage device 65, the length of the clips, and the compression ratio

identified in conjunction with the storage of recorded clips. The Remote Video Assist Recorder Box 10 further provides ready, i.e., near instantaneous, access to each recorded clip through the use of selection controls (such as "previous" and "next") as further detailed hereinbelow.

5           With reference to Figure 3, the elements (i.e., interface controls) of the control panel 35 of a preferred embodiment are illustrated. In addition to providing function control in relation to basic recording functionality as is known in relation to digital video recorder technology, the control panel 35 provides access to additional functionality through alternate assignment of feature operation to certain of the elements of the control  
10   panel 35 as detailed below. Such alternate assignment of functionality is enabled through selection of options via the display 30 in coordination with the control board 60 in a preferred embodiment is as further detailed below.

          The interface controls of the control panel 35 include a Cue/Play button 70, a Stop button 75, and a Record button 80 to control playback of the video and recording. It is  
15   noted that while a preferred embodiment provides for automatic recording upon the "rolling" of the camera, it may alternatively be set to require manual selection (e.g., via simultaneous selection of the Record button 80 and the Cue/Play button 70) before recording may commence. Even with automatic recording, the Record button 80 (in combination with the Cue/Play button 70) may provide a manual override control to re-  
20   commence recording if stopped during filming, or to start recording of the video input signal 50 regardless of the camera status. A Record indicator 85 above the Record button 80 provides a visual indicator that recording is taking place. In a preferred embodiment, the Record button 80 provides the further functionality of discontinuing playback of recorded materials and readying the system for further recording, or for monitoring of live  
25   video feed from the camera, upon selection.

          The control panel 35 further provides a Previous button 90 and a Next button 95 that may be used to control the selection of clips in playback/review modes as further detailed hereinbelow. Further interface controls are provided in control panel 35 to allow for variable film speed emulation of recorded takes upon playback review. For example, a  
30   forward speed control 100 and a reverse speed control 105 provide for forward or reverse reviewing, respectively, of a particular take which, in a preferred embodiment, provides for review on a frame-by-frame basis. The review speed, either slow motion or fast scan,

may be selectively set through a speed selector control 110 and may further be controlled via a jog/shuttle dial 115 to enable various review speeds (e.g., slow motion, fast scan, or other speeds in between). A slow motion indicator 120 and scan indicator 125 provide a visual indication of current speed emulation control settings.

5 Further features and operation of a Remote Video Assist Recorder Box 10 in accordance with a preferred embodiment herein may best be understood with reference to various display 30 screen printouts as depicted in, and with reference to, Figures 4 through 12.

Figure 4 depicts an exemplary display 30 screen such as may be seen just prior to  
10 the commencement of recording of a clip according to a preferred embodiment herein. A mode indicator 130 identifies the status of the system and further provides an indication of the material viewable on the monitor 25. When "Pass-Thru" is indicated on the mode indicator 130 (as shown), the system allows the Video input signal 50 to be relayed through to the monitor 25. In a preferred embodiment, the "Pass-Thru" mode serves as a  
15 default mode to allow for viewing of the material in the camera's view at all times, regardless of whether or not the camera is "rolling", other than during playback of previously recorded clips. Further modes which may be indicated on the mode indicator 130 include: a "Record" mode which is displayed during the time that the system is recording a clip (e.g., when the camera is "rolling"); a "Stop" mode which is displayed  
20 upon the queuing of a clip for review; and, a "Play" mode which is displayed during playback of a previously recorded clip and which may further provide an indication of the speed at which the clip is played back.

The display 30 screen of Figure 4 further illustrates a setting selector icon 135 which may be used call up a setting selector screen (as illustrated in Figure 10 and detailed  
25 hereinbelow). A disk capacity indicator 140 is also provided to provide visual and percentage indicators of the remaining storage capacity of the storage device 65. A counter display 145 provides clip duration information. A compression ratio indicator/selector 150 identifies the compression ratio at which the corresponding clip was stored in the storage device 65. Selecting the compression ratio indicator/selector 150  
30 through the touch screen display 30 further calls up a ratio compression selector screen (as illustrated in Figure 12 and detailed hereinbelow). Similarly, a frames-per-second indicator/selector 155 identifies the speed at which the corresponding clip was recorded.

Selecting the frames-per-second indicator/selector 155 through the touch screen display 30 further calls up a record-fps screen (as illustrated in Figure 9 and detailed hereinbelow). A clip indicator/selector 160 identifies the corresponding previously recorded clip (e.g., by clip number or name as further detailed below) that is set for review/playback (e.g., the last recorded clip after completion of recording, the last clip played back after playback, etc.). Selecting the clip indicator/selector 160 through the touch screen display 30 further calls up a clip list screen (as illustrated in Figure 6 and detailed hereinbelow). Lastly, an All Clips indicator 165 confirms that all recorded clips are available for playback either sequentially or through individual selection as further described hereinbelow.

Figure 5 depicts an exemplary display 30 screen printout such as may be seen upon queuing of a clip for playback according to a preferred embodiment herein. Playback of a recorded clip (e.g., a clip for which recording has just been completed) may be realized in the first instance by queuing the clip to the beginning and then commencing playback. In a preferred embodiment, a clip is cued to the beginning by pressing the Cue/Play button 70 upon completion of recording. Actual playback of a recorded clip is subsequently realized by pressing the Cue/Play button 70 again. If it is desired that playback be paused, a preferred embodiment allows for such option through selection of the Stop button 75 during playback with re-commencement of playback occurring upon selection of the Cue/Play button 70 again.

It is noted that while a preferred embodiment utilizes sequential selection of the Cue/Play button 70 for queuing and then playback, respectively, it is envisioned that playback queuing may alternatively occur automatically upon completion of recording (i.e., the recorded clip could be queued to the beginning when the camera stops "rolling") with actual playback occurring upon selection of the Cue/Play button 70 a single time. As a further alternative, it may readily be envisioned that queuing may be accomplished through selection of some interface control other than the Cue/Play button 70 and still remain within the spirit and scope of the inventive concepts set forth herein.

Returning to Figure 5, a mode indicator 130, setting selector icon 135, disk capacity indicator 140, counter display 145, compression ratio selector/indicator 150, frames-per-second selector/indicator 155, clip indicator/selector 160, and all clips indicator 165 are all provided, and operate similarly, as discussed above in relation to Figure 4. As may be seen in Figure 5, the mode indicator 130 illustrates the "Stop" mode

in relation to the corresponding clip (i.e., clip 17 in Figure 5). According to a preferred embodiment, the "Stop" mode indicates that the corresponding clip, as illustrated by the clip indicator/selector 160 has been queued to the beginning, and that the first frame of such clip is showing on monitor 25 ready for playback of the entire clip upon selection of the Cue/Play button 70. Thus, it may be seen that the "Stop" mode operates in a manner similar to a pause function wherein the clip is paused at the first frame awaiting playback.

In accordance with the operation of a preferred embodiment, switching from the "Stop" mode back to a "Pass-Thru" mode may be accomplished by selection of the Record button 80 on control panel 35. Similarly, switching from "Play" mode to "Pass-Thru" mode may also be accomplished by selection of the Record button 80 at which point playback of the previously recorded clip would stop and viewing of the video input signal 50 from the camera would be enabled on the monitor 25. A preferred embodiment also provides for recording based upon the "rolling" of the camera to override other functionality of the Remote Video Assist Recorder Box 10. Thus, for example, if the camera begins "rolling" while in "Stop" or "Play" modes, these latter functions would be stopped and recording of a new clip would automatically commence.

Further in a preferred embodiment, the "Pass-Thru" mode is utilized as a default mode when the system is not otherwise playing previously recorded clips or cued to do so. In this regard, as well, when recording stops, the monitor 25 continues to display the live video information coming through the video input signal 50 from the camera. The system further remains ready to record the next clip while showing the reference number assigned to the clip just recorded.

Figure 5 further illustrates a marks only indicator/selector 170 which provides for subsequent operation upon only clips that have been marked as further detailed hereinbelow. As well, a marked clip indicator 175 provides a visual indication in conjunction with the clip name/number that the corresponding clip has been marked. In a preferred embodiment, such marking of a clip may be utilized to indicate clips that comprise "good" takes for further production purposes.

Figure 6 depicts an exemplary display 30 clip list screen printout which may be utilized in identifying and operating upon stored clips according to a preferred embodiment herein. The screen of Figure 6 is displayed upon selection of the word "Clip" in the clip indicator/selector 160 as displayed, for example, in the screens illustrated in

Figures 4 and 5. A "P" icon 225 is provided which, upon selection, exits the clip list screen display 30 of Figure 6. Alternatively, the screen of Figure 6 is displaced with another screen upon either the selection for playback of a clip (in which case a screen as depicted in Figure 5 may be displayed) or upon commencement of recording (either manually or upon the "rolling" of the camera) in which case a screen as depicted in Figure 4, or a recording screen (not shown), may be displayed). It is noted that the "P" icon 225 is similarly utilized in conjunction with other screens to perform a similar function of returning to the main screen. In other instances, where a "P" icon is not provided, selection of blank area on the screen may serve to return to the main or previous screens.

The screen of Figure 6 provides for the display of a clip list 180 of up to twelve clips in a preferred embodiment. Entry into this screen from any other screen in which a particular clip has been operated upon results in such prior clip being highlighted as one of the clips in the clip list 180 with the remaining eleven clips comprising clips either before and/or after the highlighted clip. Since more than twelve clips may be stored in the storage device 65, a clip tally indicator 185 identifies the total number of stored clips along with an identification of the presently selected clip via a current clip indicator 190.

The jog/shuttle dial 115 on control panel 35 is utilized in a preferred embodiment to scroll through the clip list 180. Scrolling up on the list to clips prior to those displayed in the clip list 180 results in a shift in the clip list 180 to reveal earlier clips while later clips "fall" off the end of the list. Conversely, scrolling down the list to clips later than those displayed results in a shift in the clip list 180 to reveal later clips while earlier clips "fall" off the end of the list.

Scrolling through the clip list 180 results in the sequential highlighting of clips (in either a forward or reverse direction depending upon the direction of operation of the jog/shuttle dial 115). Highlighting of a particular clip results in the use of the highlighted clip as a reference point in the first instance in relation to further operations which may be selected, such as by selection of an interface control from the control panel 35. For example, selection of the Cue/Play button 70 would result in the queuing of the highlighted clip for playback with actual playback occurring upon subsequent selection of the Cue/Play button 70. Similarly, selection of the Previous button 90 or Next button 95 would result in the queuing for playback of either the clip just before or just after the reference clip, respectively.

In this latter regard, it is noted that the all clips indicator 165 and the marks only indicator 170 function as controls to selectively enable clips to be played back in accordance with a preferred embodiment. With the all clips indicator 165 selected, operation of the Previous button 90 or the Next button 95 sequentially cycles through all of the stored clips (excluding clips which have previously been deleted as set forth herein) in either the reverse or forward direction, respectively. With the marks only indicator 170 selected, operation of the Previous button 90 or the Next button 95 sequentially cycles through all of the non-deleted stored clips which have been previously marked (i.e., for which a marked clip indicator 175 has been set) in either the reverse or forward direction, respectively.

It is noted, too, that the selection of the Cue/Play button 70 while a clip is highlighted on the clip list 180 results not only in the playback of the highlighted clip, but will also result in subsequent non-deleted clips being played back sequentially. In this regard, too, either all clips will be played back, or only marked clips will be played back, depending upon whether the all clips indicator 165 or the marks only indicator 170, respectively, has been selected.

The clip list 180 provides information regarding the clip duration and speed at which each respective clip was recorded via clip duration indicators 195 and clip recorded fps indicators 200, respectively. As well, clips which have previously been marked, e.g., as "good" takes, are identified via marked clip indicators 175 displayed in association with the corresponding clips. Further clips may be marked through selection of a mark control 205 that results in the marking of a highlighted clip (or the un-marking of a marked clip if the mark control 205 is selected again).

A delete control 210 is further provided in a preferred embodiment. The delete control allows for selective deletion of previously recorded clips. Selection of the delete control 210 results in further inquiry screens (not shown) which allow the user to selectively delete only a selected clip, all un-marked clips, or all clips. It may also be envisioned that the system could be programmed to provide for selective deletion of other groupings of clips than those described above in conjunction with a preferred embodiment.

In operation, a preferred embodiment automatically and sequentially assigns a numeric reference 215 to clips as they are recorded. A name change selector 220 provides a means for individually changing the reference name/number to be used to identify one or

more particular stored clips. For example, it may be envisioned that the name change selector 220 may be used to associate a reference name, such as a scene/take identifier, comments, or the like. Upon changing the name/number of a clip, the clip list 180 will show the new name/number (not shown) in place of the numeric reference 210 for the clip.

5           Selection of the name change selector 220 results in the display of a first alphanumeric input screen (as illustrated in Figure 7 and detailed below). The screen of Figure 7, in conjunction with the screen of Figure 8, provides a means for entry of alphanumeric information 231 (letters, numbers, and certain symbols) in order to set a name or other reference to be associated with a clip that has been highlighted from the clip  
10 list 180. In a preferred embodiment, the two screens may be selectively toggled between in order to input a complete reference name/number for the corresponding clip. Such toggling is accomplished through selection of a screen toggle selector 230. Sequential selection of alphanumeric characters results in the creation of a reference name/number that is displayed in reference entry box 235. A backspace selector 240 is provided in order  
15 to replace previously entered characters. Upon completion of entry of the reference name/number, an OK selector 240 allows for acceptance of the reference name/number and subsequent association of such reference name/number with the corresponding clip in an internal database. Should it be desired to cancel the name change operation without effecting a change to the reference name/number of the corresponding clip, a Cancel  
20 selector 245 is also provided.

Figure 9 depicts an exemplary display 30 screen for use in entering information regarding the speed at which a particular clip has been recorded according to a preferred embodiment herein. Upon selection of this screen as previously described, the user may selectively identify the frames per second at which the corresponding clip was required.  
25 To this end, a keypad 250 is provided for direct input of a frame speed, which may include a negative speed in a preferred embodiment (note: selection of a negative speed emulation causes the corresponding clip to be played in reverse upon selection of the Cue/Play button 70. Alternatively, preset speeds 255 are provided for direct selection by the user and association with the corresponding clip. A fps display 260 provides a visual  
30 indication of the fps speed associated with the corresponding clip. A Done selector 265 is provided to exit the screen of Figure 9 when speed selection is complete.



Figure 10 depicts an exemplary display 30 screen that may be used to establish nominal settings for use by the Remote Video Assist Recorder Box 10. A video standard setting selector 270 provides a means for the user to identify the video standard utilized by the camera in the "filming" of takes. In this regard, a preferred embodiment offers selection (through toggling of the video standard setting selector 270) between the two known, primary video standards NTSC and PAL. It is noted that while the preferred embodiment offers selection between two video standards, other video standards may be envisioned for implementation, e.g., HDTV, and may be incorporated for selection in manners consistent with those described herein. It is further noted that different clips can be recorded in different formats in a preferred embodiment; however, upon playback the correct nominal video standard must be set or the clips of a different standard than is set will not play back correctly. It is envisioned, though, that the system may be modified to provide for automatically changing to the appropriate video standard for playback as necessary based upon the standard utilized in conjunction with the various recorded clips being played back.

Further, a preferred embodiment selectively offers three standards in relation to slow motion settings. In this regard, toggle selection of a slow motion setting selector 275 alternately switches between Frame standard, a Field 1 standard, and a Field 12 standard. Still further, a nominal fps setting selector 280 allows for selective identification of the frames-per-second at which the camera filming the takes is operating. In this regard, selection of the nominal fps setting selector 280 results in the display of a nominal fps selection screen such as is depicted in Figure 11.

With reference to Figure 11, a preferred embodiment provides for the selection between a 24, 25, or a 30 frames-per-second standard in relation to the shooting camera. It is noted that the nominal fps setting is a system-wide setting that represents the basic frame rate the overall production (i.e., the shooting camera) is utilizing. It is envisioned that for most film work the nominal fps would be 24 fps with commercial and graphic production being typical at 30 fps. The nominal 25 fps would typically envisioned with respect to the use of the PAL video standard. In a preferred embodiment, the nominal fps is associated with each clip at the time it is recorded. Changing the record fps value after recording allows for the emulation of the effect of shooting film at a speed different from the nominal speed.

An fps display 260 and a Done selector 265 are also provided in the screen of Figure 11 and operate as previously described hereinabove. It is noted that while a preferred embodiment provides for a separate screen to enable selection between the three nominal fps settings while a toggle mechanism enables selection between the three slow  
5 motion standard settings, it is readily envisioned that the use of a separate screen or a toggle mechanism may be interchangeably utilized without departing from the scope or spirit of the inventive concepts set forth herein.

With reference back to Figure 10, a clear disk selector 285 is provided that allows for the deletion of contents and attendant reformatting of the storage device 65 in a  
10 preferred embodiment herein. Lastly, a "P" icon 225 is provided in the settings screen of Figure 10 to result in exit from that screen.

Figure 12 depicts an exemplary display 30 screen for use in setting the compression ratio to be utilized in connection with the recording of the corresponding clip. To this end a compression ratio selector 290 allows for the adjustment of the compression  
15 ratio. In a preferred embodiment, ratios from 1:1 through 20:1 may be selected using the up or down arrows of the compression ratio selector 290. A compression ratio display 295 provides a visual indication of the compression ratio selected. It is noted that while a compression ratio down to 1:1 may be selected, hard drive speed may set practical limits to compression. In a preferred embodiment, for example, a practical limit of 4:1 is defined  
20 by the speed of the hard drive.

Based upon the remaining storage capacity of the storage device 65, along with the information regarding the current compression ratio selector 290 setting selected, the Remote Video Assist Recorder Box 10 of a preferred embodiment calculates and displays capacity estimates 300. In a preferred embodiment, the capacity estimates 300 include an  
25 indication of the estimated total recording time remaining in the storage device 65, the overall estimated recording time in the storage device 65, and an estimate of the minutes per Gigabyte of storage capacity associated with the storage device 65. It is noted that different compression ratios may be individually selected for different recorded clips in a preferred embodiment. While the preferred embodiment does not display the respective  
30 compression ratios for each different clip, it is envisioned that such information may readily be provided, such as through display in association with the clip list 180.

The present invention has been set forth in the form of its preferred embodiments. Other alternative embodiments may be devised, however, and are intended to be within the scope of this application. For example, while entry of certain information and selection of features in accordance with a preferred embodiment is provided through the display 30, it  
5 may also be envisioned that such operations may be provided through other means, such as a separate keyboard, a voice recognition interface, a serial interface, or other means known to those skilled in the art. Furthermore, it is intended that modifications to the disclosed system may be made without departing from the scope and spirit of the inventive concepts set forth herein and defined in the appended claims.

What is claimed is:

1. A video assist system comprising:

means for receiving a video input signal from a filming camera;

5 means for receiving a camera status signal indicating whether the filming camera is filming or not filming;

a digitizing board for receiving the information from said video input signal receiving means and for enabling digital recording thereof, wherein recording automatically commences when an indication that the camera is filming is received on said camera status signal means, and further wherein recording is automatically stopped when an indication that the camera has stopped filming is received on said camera status signal means; and,

control means for selectively enabling playback of the recorded information.

15 2. A video assist method comprising:

receiving a video input signal from a filming camera;

automatically recording material from the video input signal concurrently with the start of filming by the filming camera;

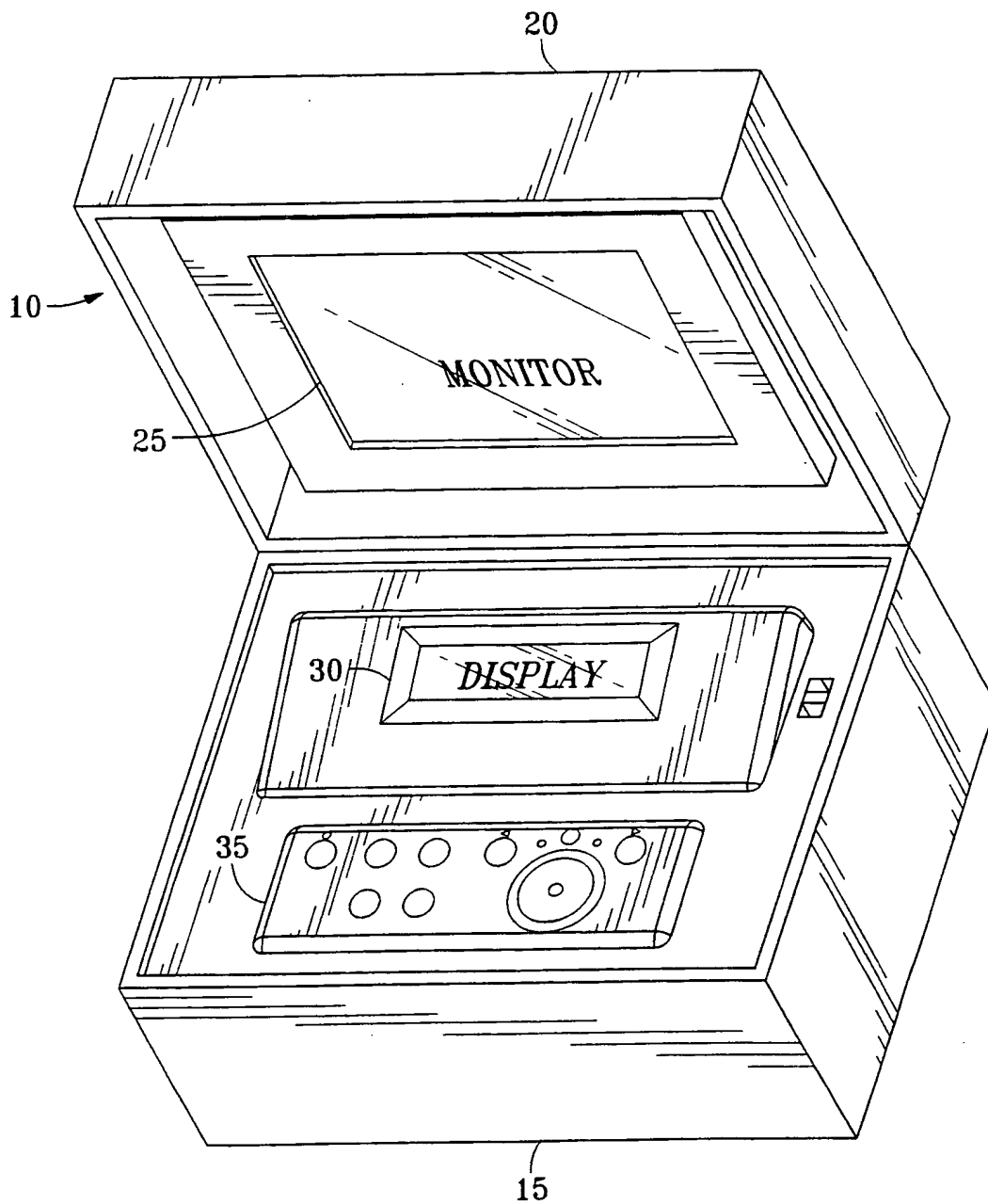
20 automatically stopping the recording of material from the video input signal concurrently with the stopping of filming by the filming camera;

storing reference information in association with the recorded material from the video input signal; and,

selectively enabling playback of information recorded from the video input signal.

25

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*FIG. 1*

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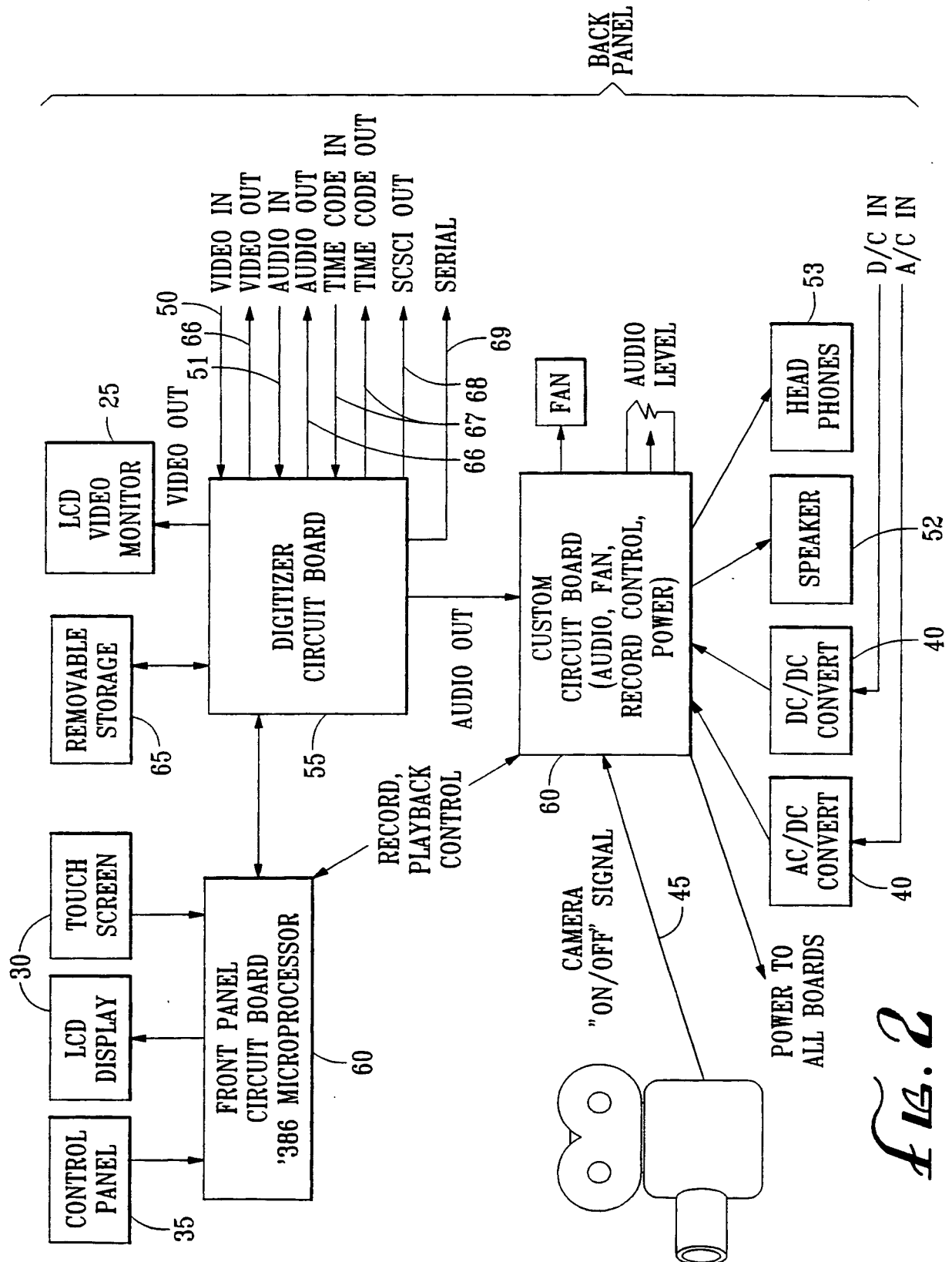


Fig. 2

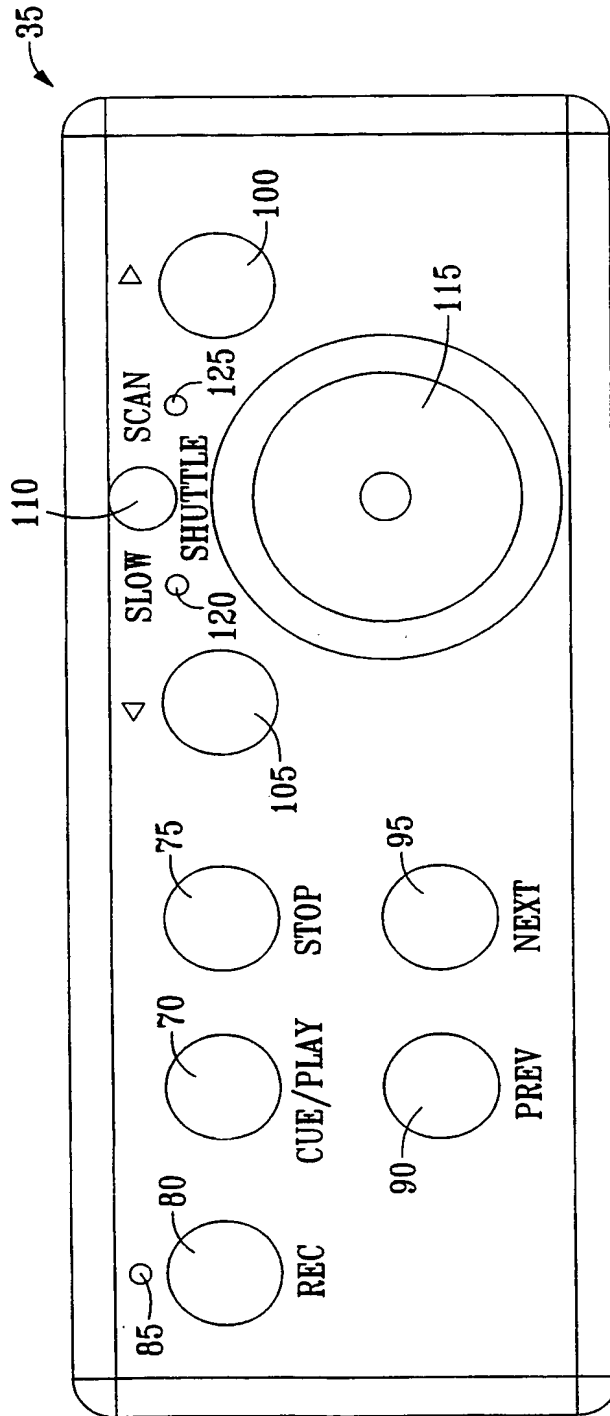
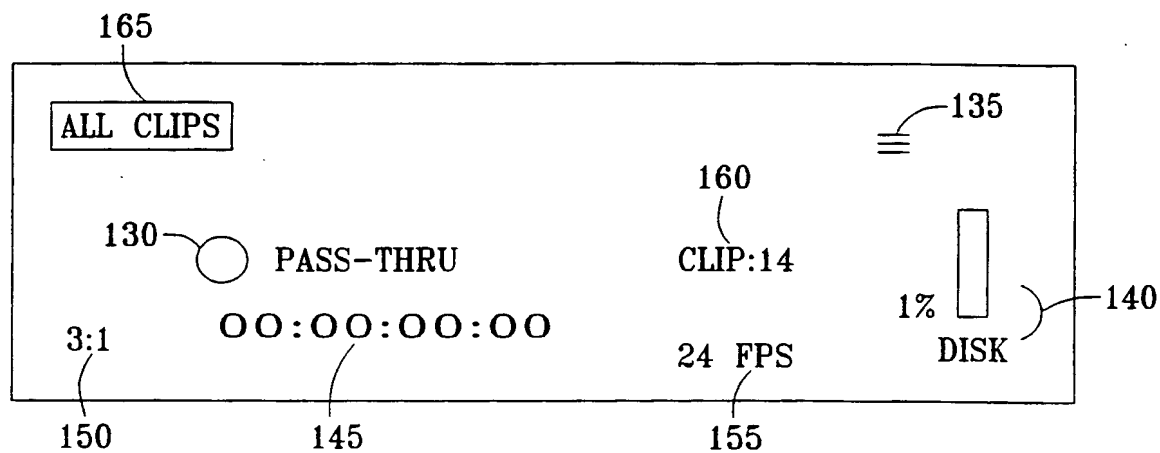
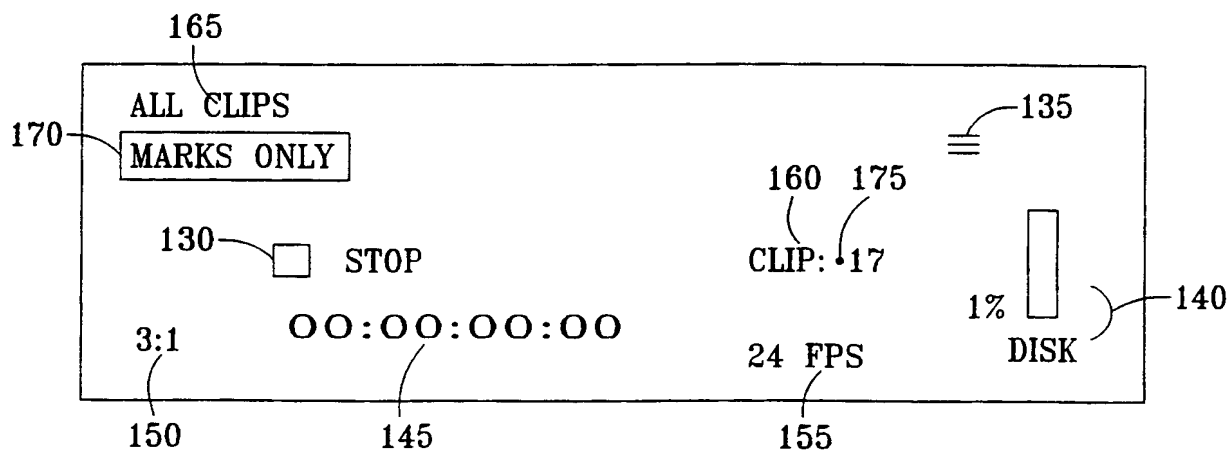


FIG. 3



*Fig. 4*



*Fig. 5*



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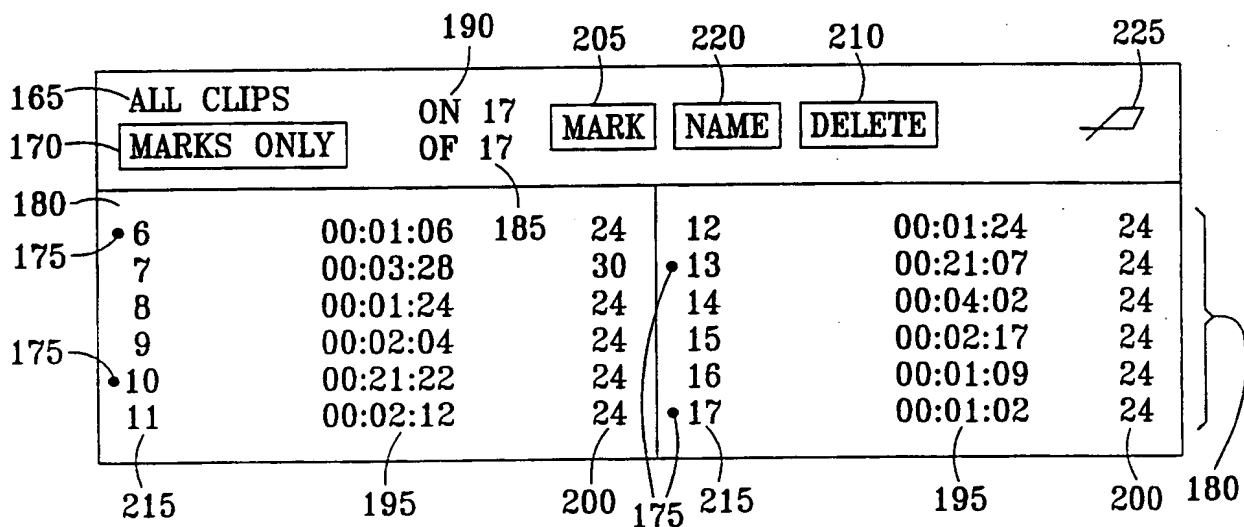
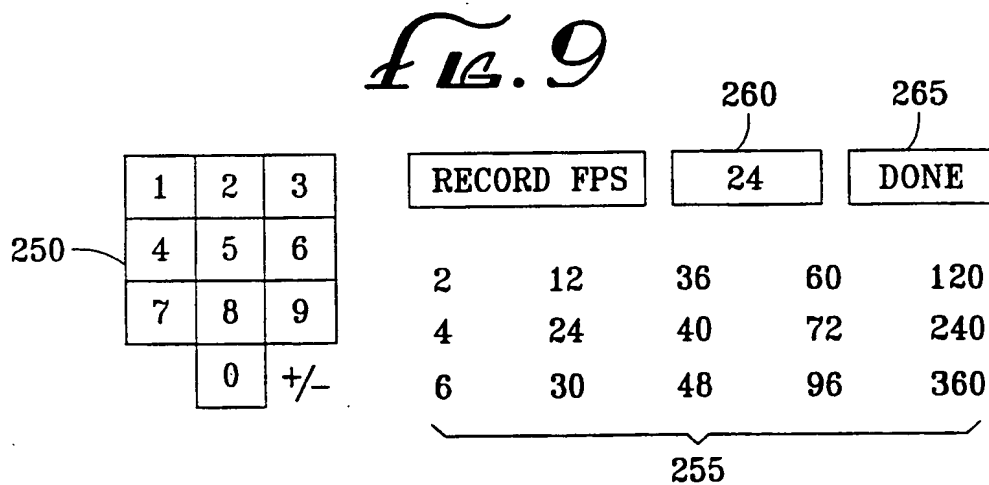


FIG. 6



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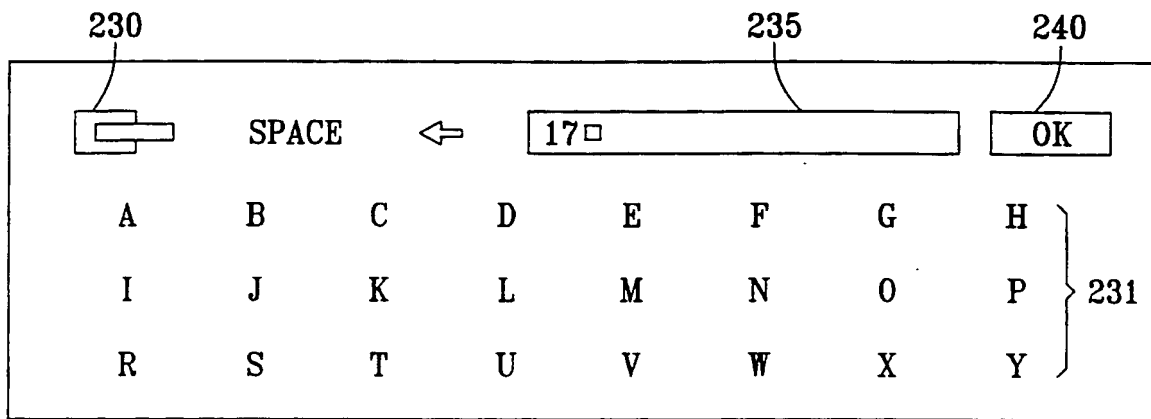


FIG. 7

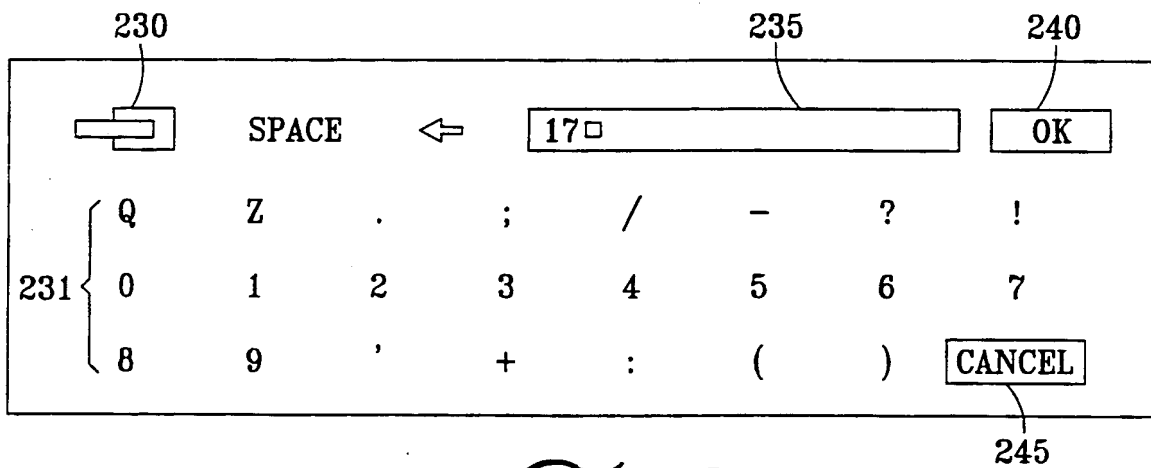
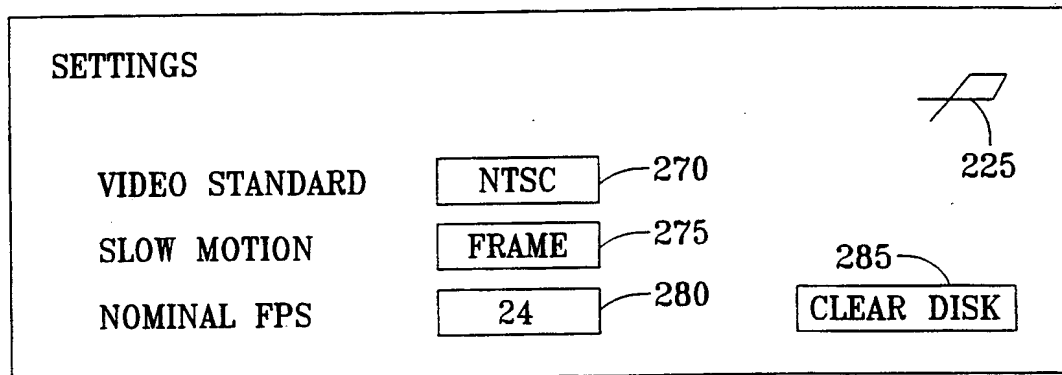
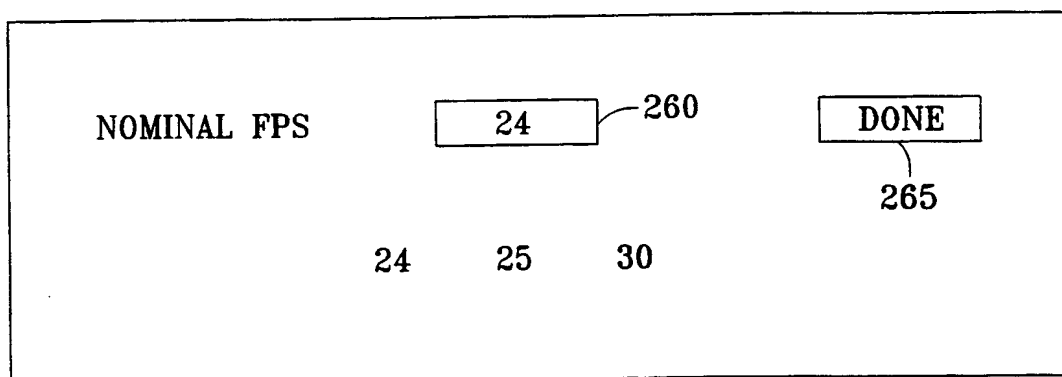
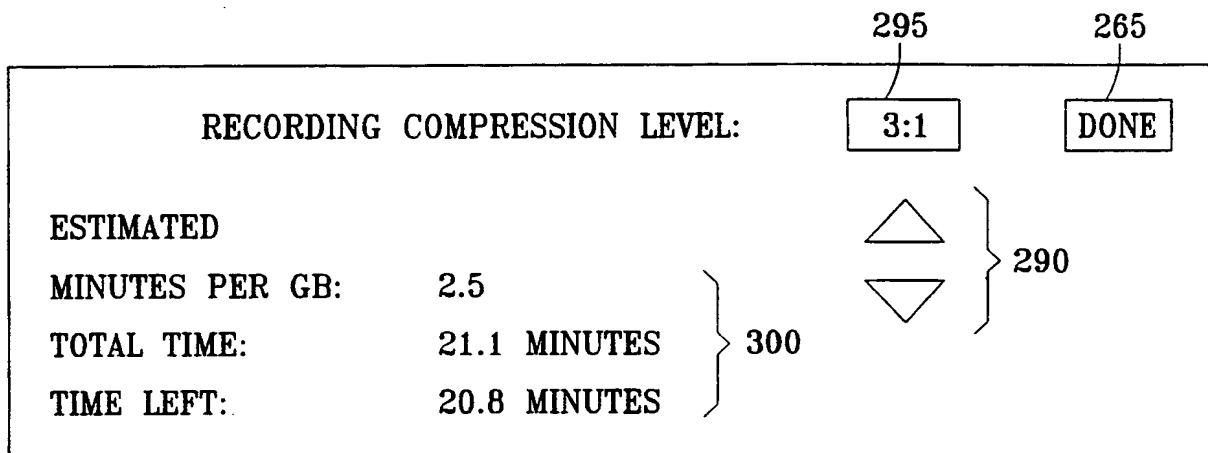


FIG. 8

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*FIG. 10**FIG. 11*

*Fig. 12*

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/13021

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 5/76

US CL :386/46

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
none

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,659,289 A (ZONKOSKI et al) 19 August 1997, Fig. 2.	1-2
A	US 5,204,707 A (HARVEY) 20 April 1993, Fig. 1.	1-2
A	US 5,729,777 A (SAITO et al) 17 March 1998, Fig. 8.	1-2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  
03 AUGUST 1999

Date of mailing of the international search report  
26 OCT 1999

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/13021

## B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

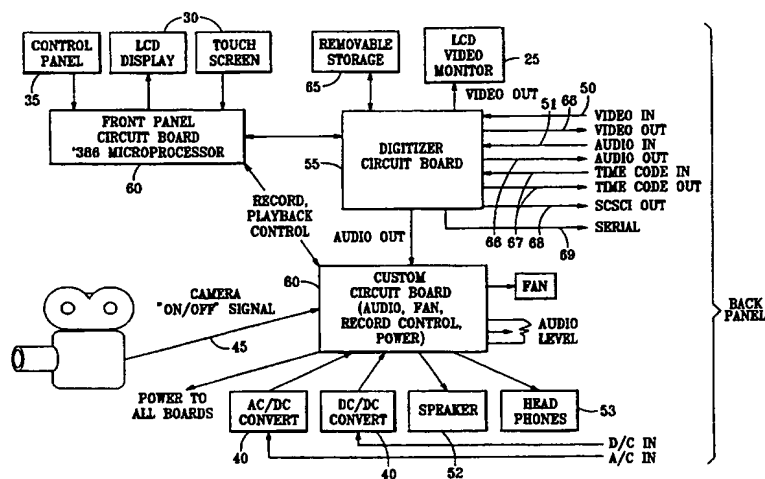
386/46, 1, 117, 38; 358/906, 909.1; 360/5, 7; 340/438, 425.5; 348/148, 149, 143, 144, 152, 153, 154, 155, 156, 157, 158, 159, 160.



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>H04N 5/76</b>		<b>A1</b>	(11) International Publication Number: <b>WO 99/65238</b>
			(43) International Publication Date: 16 December 1999 (16.12.99)
(21) International Application Number: PCT/US99/13021		(81) Designated States: AU, CA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 11 June 1999 (11.06.99)			
(30) Priority Data: 60/089,046 12 June 1998 (12.06.98) US Not furnished 10 June 1999 (10.06.99) US		<b>Published</b> With international search report. With amended claims and statement.	
(71) Applicant: PANAVISION, INC. [US/US]; 6219 DeSoto Avenue, Woodland Hills, CA 91367 (US).		<b>Date of publication of the amended claims and statement:</b> 24 February 2000 (24.02.00)	
(72) Inventors: SHORE, Morris, M.; 19 Candyhill Road, Sudbury, MA 01776 (US). ELLIOTT, Edward, L.; 31 Buena Vista Park #1, Cambridge, MA 02140 (US). BOWERS, Wynnewood, D.; 363 School Street, Boylston, MA 01505 (US). PAGEL, Edward; 5732 Wilbur Avenue, Tarzana, CA 91356 (US). CHANG, Eric, M.; 2251 South Bentley Avenue #105, Los Angeles, CA 90064 (US). MURDOCH, Nolan; 25616 Chimney Road, Valencia, CA 91355 (US).			
(74) Agents: BALGENORTH, Charles, R. et al.; Lyon & Lyon LLP, Suite 4600, 633 West Fifth Street, Los Angeles, CA 90071-2066 (US).			

(54) Title: REMOTE VIDEO ASSIST RECORDER BOX



## (57) Abstract

A Remote Video Assist Recorder Box (10) is suitable for remote use in "on location" production environment. Multiple takes on a single channel may be digitally recorded concurrently with camera filming. Recording is automatically triggered upon the "rolling" of the camera (45) and stops when the camera stops filming. Recorded clips may be marked as "good" takes. Fast playback of recorded clips may be provided through either one-button (115) or automatic queuing to the beginning of a just recorded clip. Clips may be played back individually, or all or only marked clips may be played back sequentially. Clips may also be selectively deleted either individually, or in a group (all marked clips or all clips). Selective control of compression ratios, frames-per-second emulation of recorded clips, nominal video standards, nominal speed, and slow motion standards are also included. The Remote Video Assist Recorder Box (10) may be operated as a "standalone" system in a production environment, or may be integrated into a larger, full-feature video assist system; alternatively, recorded clips may be exported from the system to other systems or devices.

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CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		



## AMENDED CLAIMS

[received by the International Bureau on 27 December 1999 (27.12.99);  
new claims 3-24 added; remaining claims unchanged (5 pages)]

1. A video assist system comprising:  
means for receiving a video input signal from a filming camera;  
5 means for receiving a camera status signal indicating whether the filming camera is  
filming or not filming;  
a digitizing board for receiving the information from said video input signal  
receiving means and for enabling digital recording thereof, wherein recording  
automatically commences when an indication that the camera is filming is received on said  
10 camera status signal means, and further wherein recording is automatically stopped when  
an indication that the camera has stopped filming is received on said camera status signal  
means; and,  
control means for selectively enabling playback of the recorded information.
- 15 2. A video assist method comprising:  
receiving a video input signal from a filming camera;  
automatically recording material from the video input signal concurrently with the  
start of filming by the filming camera;  
automatically stopping the recording of material from the video input signal  
20 concurrently with the stopping of filming by the filming camera;  
storing reference information in association with the recorded material from the  
video input signal; and,  
selectively enabling playback of information recorded from the video input signal.
- 25 3. A video assist system comprising:  
a video signal connection for receiving at least one video input signal;  
means for digitally recording the at least one video input signal;  
means for viewing the at least one video signal concurrently with the recording  
thereof;  
30 means for entering and storing information in association with the at least one  
video input signal recorded; and,

playback means for selectively playing back one or more of the at least one video input signal recorded.

4. The video assist system of Claim 3 wherein the video signal connection is  
5 to a filming camera which provides the at least one video input signal to be recorded and  
wherein video input signals are received sequentially when more than one video input  
signal is to be recorded and wherein the system further comprises:

a camera status signal connection for receiving a camera status signal indicating  
when the filming camera starts filming and when the filming camera stops filming; and,

10 wherein recording of the at least one video input signal automatically commences  
when the filming camera starts filming and wherein recording of the at least one video  
input signal automatically stops when the filming camera stops filming.

5. The video assist system of Claim 3 wherein the information entered and  
15 stored comprises one or more of a scene identifier, take identifier, production date, and  
comments.

6. The video assist system of Claim 3 wherein the information entered and  
stored comprises edit information identifying a recorded video input signal which is  
20 determined to comprise a good take.

7. The video assist system of Claim 3 wherein the playback means provides  
for automatic cueing to the beginning of the at least one video input signal upon  
completion of recording of that at least one video input signal.

25 8. The video assist system of Claim 7 wherein said playback means provides  
near instantaneous playback of the recorded video signal.

9. The video assist system of Claim 8 wherein said playback means further  
comprises speed selection means for selectively adjusting the playback speed of the at  
30 least one video input signal recorded.

10. The video assist system of Claim 4 wherein multiple video input signals are received and recorded and wherein the system further comprises:

means for searching through the recorded video input signals for a desired one or more of the received and recorded video input signals.

5

11. The video assist system of Claim 10 wherein said means for searching selectively enables searching based upon the entered and stored information.

12. The video assist system of Claim 8 wherein one of the at least one video input signals received and recorded is played back by said playback means and wherein the system further comprises

means for switching between the at least one video signal being played back and the recording of a new video input signal.

15

13. The video assist system of Claim 8 further comprising:

means for selectively effecting forward or backward movement within the at least one previously recorded video signal being played back by said playback means.

14. The video assist system of Claim 11 wherein said means for searching results in identification of a plurality of previously recorded materials and further comprising sequencing means for selective ordering of the search results to provide a playback sequence.

15. The video assist system of Claim 4 further comprising export means for selectively exporting from the system a sequence of previously recorded video input signals.

16. The video assist system of Claim 15 wherein the export means further comprises means for changing the sequence order to be exported.

30

17. The video assist system of Claim 3 further comprising interface controls allowing for variable speed emulation of recorded video input signals upon playback.

18. The video assist system of Claim 3 wherein the playback means further comprises controls providing for review of a recorded video input signal on a frame by frame basis.

5

19. The video assist system of Claim 3 wherein the playback means further comprises controls for selectively setting the review speed of a recorded video input signal upon playback.

10

20. The video assist system of Claim 19 wherein the controls for selectively setting the review speed of a recorded video input signal upon playback comprises a speed selector control and a jog/shuttle dial.

15

21. In a video assist system having a video signal connection for receiving a video signal comprising at least one video input signal, a method comprising the steps of:  
sequentially digitally recording the at least one video input signal;  
selectively playing back one or more video input signals upon completion of recording thereof;  
displaying the video input signal(s) selectively played back; and,  
20 associating information with the respective video input signal(s).

25

22. The method of Claim 21 wherein the information associated with the respective video input signal(s) comprises one or more of scene identifier, take identifier, name, or comments.

23. The method of Claim 21 wherein the information associated with the respective video input signal(s) comprises a mark indicating a good take.

30

24. The method of Claim 21 further comprising the steps of:  
searching previously recorded video input signals to identify at least one video signal to be retrieved for playback and wherein said searching selectively utilizes previously stored information;

retrieving the at least one previously recorded video input signal identified to be retrieved; and,

selectively playing back one or more of the previously recorded video input signals retrieved.

5

**AMENDED SHEET (ARTICLE 19)**

**STATEMENT UNDER ARTICLE 19**

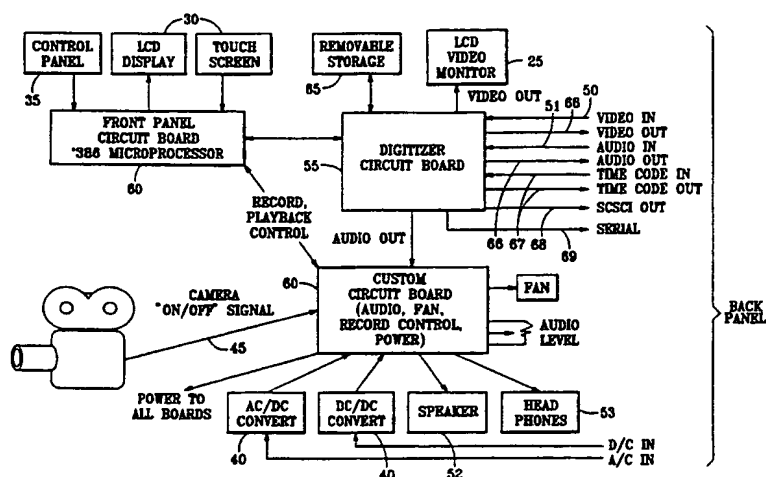
Claims 1 and 2 are unchanged. Claims 3 through 24 are new claims that define the invention in a somewhat different manner than the other independent claims.



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>H04N 5/76</b>		<b>A1</b>	(11) International Publication Number: <b>WO 99/65238</b>
			(43) International Publication Date: 16 December 1999 (16.12.99)
(21) International Application Number: PCT/US99/13021 (22) International Filing Date: 11 June 1999 (11.06.99) (30) Priority Data: 60/089,046          12 June 1998 (12.06.98)          US 09/329,639          10 June 1999 (10.06.99)          US (71) Applicant: PANAVISION, INC. [US/US]; 6219 DeSoto Avenue, Woodland Hills, CA 91367 (US). (72) Inventors: SHORE, Morris, M.; 19 Candyhill Road, Sudbury, MA 01776 (US). ELLIOTT, Edward, L.; 31 Buena Vista Park #1, Cambridge, MA 02140 (US). BOWERS, Wynnewood, D.; 363 School Street, Boylston, MA 01505 (US). PAGEL, Edward; 5732 Wilbur Avenue, Tarzana, CA 91356 (US). CHANG, Eric, M.; 2251 South Bentley Avenue #105, Los Angeles, CA 90064 (US). MURDOCH, Nolan; 25616 Chimney Road, Valencia, CA 91355 (US). (74) Agents: BALGENORTH, Charles, R. et al.; Lyon & Lyon LLP, Suite 4600, 633 West Fifth Street, Los Angeles, CA 90071-2066 (US).			(81) Designated States: AU, CA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>With amended claims and statement.</i>  <b>Date of publication of the amended claims and statement:</b> 24 February 2000 (24.02.00)

(54) Title: REMOTE VIDEO ASSIST RECORDER BOX



## (57) Abstract

A Remote Video Assist Recorder Box (10) is suitable for remote use in "on location" production environment. Multiple takes on a single channel may be digitally recorded concurrently with camera filming. Recording is automatically triggered upon the "rolling" of the camera (45) and stops when the camera stops filming. Recorded clips may be marked as "good" takes. Fast playback of recorded clips may be provided through either one-button (115) or automatic queuing to the beginning of a just recorded clip. Clips may be played back individually, or all or only marked clips may be played back sequentially. Clips may also be selectively deleted either individually, or in a group (all marked clips or all clips). Selective control of compression ratios, frames-per-second emulation of recorded clips, nominal video standards, nominal speed, and slow motion standards are also included. The Remote Video Assist Recorder Box (10) may be operated as a "standalone" system in a production environment, or may be integrated into a larger, full-feature video assist system; alternatively, recorded clips may be exported from the system to other systems or devices.

\*(Referred to in PCT Gazette No. 30/2000, Section II)

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CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						